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10/645,787	08/20/2003	Sung Soo Park	8029P015X	8207

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EXAMINER	
NGUYEN, QUANG N	

ART UNIT	PAPER NUMBER
2141	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/645,787	PARK, SUNG SOO	
	Examiner	Art Unit	
	Quang N. Nguyen	2141	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 November 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *20070917*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Detailed Action

1. This Office Action is responsive to the Amendment filed on 11/30/2007. Claims 1, 11 and 21 have been amended. Claims 1-26 remain pending for examination.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 09/17/2007 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-7, 11-13, 16-18 and 20-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Calamvokis et al. (US 6,856,622), hereinafter "Calamvokis", in view of "A Multicast Single-Queue Switch with a Novel Copy Mechanism" by Hashemi et al., hereinafter "Hashemi".

5. As to claim 1, **Calamvokis** discloses a method for multicasting a data cell received in a switch structure, comprising:

registering an address and priority corresponding to said data cell at an ingress port *(when ingress switch port 102A receives the LCS request, it adds the request to a multicast queue for priority 0)* **(Calamvokis, col. 4, line 37 – col. 5, line 30)**;

controlling a flow of said data cell **(Calamvokis, col. 4, line 37 – col. 5, line 30)**;

asserting a multicast service request for said data cell *(ingress switch port 102A sends a request to scheduler subsystem 106 indicating that line card 108A is to send a priority 0 multicast cell with label M)* **(Calamvokis, col. 4, line 37 – col. 5, line 30)**;

in response to said asserting, granting said multicast service request *(sends a grant to the ingress switch port 102A)* **(Calamvokis, col. 4, line 37 – col. 5, line 30)**;

arranging a multicast fan-out for said data cell *(scheduler subsystem 106 also sends reverse routing tags to all scheduled egress ports 102B)* **(Calamvokis, col. 4, line 37 – col. 5, line 30)**; and

in response to said arranging, configuring said switch structure *(at time T, ingress switch port 102A transmits the cell into the crossbar system 104 and a copy of the cell arrives at each egress switch port 108B with fixed delay)* **(Calamvokis, col. 4, line 37 – col. 5, line 30)**.

However, **Calamvokis** does not **explicitly** disclose registering an address and priority corresponding to said data cell in a memory cell, the memory cell being addressable by the priority and asserting a multicast service request for said data cell using the memory cell.

In the same field of endeavor, **Hashemi** discloses a multicasting single-queue switch is a RAM-based shared-buffer switch in which incoming cells from input lines are all saved in a common RAM memory in parallel format and for each cell, a minicell representing the cell's destination output line in the switch fabric, its address in the memory, and its priority level *(i.e., registering an address and priority corresponding to said incoming/data cell in a mini/memory cell)* is sent to a queue controller which itself consists of a tagging unit and a sequencer circuit. **Hashemi** also discloses the minicells then enter a sequencer where, based on the destination output number of the minicells, they are ordered within a set of interleaved logical output queues, including a multicast queue *(i.e., asserting a multicast service request using the mini/memory cell)* **(Hashemi, page 801, section 2 – Principles of Switching and Multicasting Mechanism)**.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the features of using mini/memory cells to represent an address and priority corresponding to incoming/data cells for switching and multicasting, as disclosed by **Hashemi**, into the teachings of **Calamvokis**. One would be motivated to do so to improve the performance of the switch for multicast traffic and to provide capability to absorb bursty traffics at the inputs of the switch **(Hashemi, pages 806-807, section 5 – Conclusion)**.

6. As to claim 2, **Calamvokis-Hashemi** discloses the method as recited in claim 1 wherein said switch structure comprises a crossbar switch **(crossbar system 104 of Fig. 1)**.

7. As to claim 3, **Calamvokis-Hashemi** discloses the method as recited in claim 1 further comprising granting service to said ingress port, wherein said granting service is performed upon said granting said multicast service request *(scheduler subsystem 106 sends a grant to the ingress switch port 102A indicating that the cell will be needed at time T)* **(Calamvokis, col. 4, line 37 – col. 5, line 30)**.

8. As to claim 4, **Calamvokis-Hashemi** discloses the method as recited in claim 3 wherein said granting service is performed before said arranging *(scheduler subsystem 106 sends a grant to the ingress switch port 102A indicating that the cell will be needed at time T before sending reverse routing tags to all scheduled egress ports 102B)* **(Calamvokis, col. 4, line 37 – col. 5, line 30)**.

9. As to claim 5, **Calamvokis-Hashemi** discloses the method as recited in claim 1 wherein said data cell has service priority over a unicast cell **(a multicast data cell has a service priority over a unicast cell)**.

10. As to claim 6, **Calamvokis-Hashemi** discloses the method as recited in claim 1 wherein said data cell comprises one of a plurality of multicast cells and wherein said granting further comprises: comparing a request priority among said plurality of multicast cells; and responsive to said comparing, selecting said data cell *(port processor chip 114 sends requests to the scheduler plane corresponding to the priority of the request)* **(Calamvokis, col. 6, lines 41-63)**.

11. As to claim 7, **Calamvokis-Hashemi** discloses the method as recited in claim 1 wherein said arranging comprises: generating a request signal for said multicast fan-out; asserting a transfer request to a plurality of affected egress ports; and in response to said asserting a transfer request, giving by each of said plurality of egress ports a corresponding grant signal to said ingress port *(scheduler subsystem 106 also sends reverse routing tags to all scheduled egress ports 102B and if the grant exhausts the fan-out for this request, scheduler subsystem 106 sends a dequeue indicator to ingress switch port 102A along with the grant)* **(Calamvokis, col. 4, line 37 – col. 5, line 30)**.

12. As to claims 11-12, system claims 11-12 contain similar limitations as those of method claims 1-2; therefore, they are rejected under the same rationale.

13. As to claim 13, **Calamvokis-Hashemi** discloses the system claim of claim 11, wherein said switch structure comprises a multicast storage queue for storing said data cell *(multicast output queues of ingress line card 108A as illustrated in Fig. 2A)*; and a multicast storage controller coupled to said multicast storage queue for controlling the flow of said data cell within said multicast storage queue *(when ingress line card 108A receives the LCS grant/credit signal, it transmits the LCS cell along with the sequence number sent by switch port 102A)* **(Calamvokis, col. 4, line 37 – col. 5, line 30)**.

14. As to claim 16, **Calamvokis-Hashemi** discloses the system of claim 13, wherein said multicast storage controller reshuffles a service order within said multicast storage queue upon receiving said data cell *(when scheduler subsystem 106 is able to receive new requests, port processor chip 114 sends requests to the scheduler plane corresponding to the priority of the request)* **(Calamvokis, col. 6, lines 41-63)**.

15. As to claim 17, **Calamvokis-Hashemi** discloses the system of claim 13 wherein said multicast storage controller asserts a multicast based priority over a unicast cell **(a multicast data cell has a service priority over a unicast cell)**.

16. As to claim 18, **Calamvokis-Hashemi** discloses the system of claim 13, wherein said multicast storage controller makes a priority based service request to said multicast grant generator *(when scheduler subsystem 106 is able to receive new requests, port processor chip 114 sends requests to the scheduler plane corresponding to the priority of the request)* **(Calamvokis, col. 6, lines 41-63)**; wherein responsive to said service request, said multicast grant generator provides a service grant *(scheduler subsystem 106 sends a grant to the switch port 102A indicating that the cell will be needed at time T)*; and wherein responsive to said service grant, said multicast storage controller extracts said data cell from said multicast storage queue for service *(at time T, ingress switch port 102A transmits the cell into the crossbar subsystem 104 for service)* **(Calamvokis, col. 4, line 37 – col. 5, line 30)**.

17. As to claim 20, **Calamvokis-Hashemi** discloses the system of claim 11, further comprising a multicast request generator register for generating a request signal to effectuate multicast fan-out of said data cell *(scheduler subsystem 106 also sends reverse routing tags to all scheduled egress ports 102B and if the grant exhausts the fan-out for this request, scheduler subsystem 106 sends a dequeue indicator to ingress switch port 102A along with the grant)* **(Calamvokis, col. 4, line 37 – col. 5, line 30)**.

18. As to claim 21, **Calamvokis-Hashemi** discloses the system of claim 11, further comprising a read out and transfer register for generating a read signal to effectuate transfer of a payload corresponding to said data cell **(Calamvokis, col. 5, lines 37-61)**.

19. As to claims 22-26, method claims 22-26 contain similar limitations as those of method and system claims 1, 5, 6, 8 and 16; therefore, they are rejected under the same rationale.

20. Claims 8-9 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Calamvokis-Hashemi, in view of Hughes et al. (US 6,747,971), hereinafter "Hughes".

21. As to claim 8, **Calamvokis-Hashemi** discloses the method as recited in claim 7, but does not explicitly teach determining that said data cell is not departing, wherein said determining is performed after said giving; in response to said determining, further

determining that a unicast cell is ready for launch; and in response to said further determining, launching said unicast cell.

In an analogous art, **Hughes** discloses a crossbar switch with independent schedulers to determine priority between multicast and unicast traffic, wherein contention between multicast and unicast mappings may be resolved according to a contention resolution process such as (1) primary cell requests win over secondary requests; (2) contention between primary requests resolved in favor of the queue in speed up mode; (3) contention between primary requests from queues in speed up mode are determined by unicast preferred mode, multicast preferred mode or alternate between favoring unicast and multicast requests *(if a multicast cell is not departing and a unicast cell is ready, then launching said unicast cell, i.e., alternate mode)* **(Hughes, col. 13, lines 12-24)**.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the features of launching the ready unicast cell, when determining the multicast cell is not departing, as disclosed by **Hughes**, into the teachings of **Calamvokis-Hashemi** to allow the system to maintain 50%-50% fairness by toggling contention favoritism between multicast and unicast traffic **(Hughes, col. 14, lines 22-32)**.

22. As to claim 9, **Calamvokis-Hashemi-Hughes** discloses the method as recited in claim 1 further comprising: determining that a unicast iteration is in progress; and in response to said determining, preventing generation of a request signal by said ingress

port while said unicast iteration is in progress; wherein said determining and said preventing are performed before said controlling *(during the request/grant phase, output control ports 1, 2 and 4 grant each of the requests 901, 902, 903 from the input control 1 while the input control port 2 receives no grants and his requests 904 and 905 go unfulfilled)* **(Hughes, col. 17, lines 12-29)**.

23. As to claim 19, **Calamvokis-Hashemi-Hughes** discloses the system of claim 18, wherein said multicast grant generator updates a preference pointer *(after the selection is made, the preference ranking/pointer is shifted one unit)* **(Hughes, col. 18, lines 3-54)**.

24. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Calamvokis-Hashemi, in view of Beshai et al. (US 7,000,026), hereinafter "Beshai".

25. As to claim 10, **Calamvokis-Hashemi** discloses the method as recited in claim 1, but does not explicitly teach wherein said address further corresponds to a location within an ingress queue of said switch structure at which a payload corresponding to said data cell is stored.

In an analogous art, **Beshai** discloses a method and system for transferring data segments of a data stream across multi-channel links in a high-capacity network, wherein when the header of an incoming data segment is read and a destination is identified, the segment *(i.e., payload)* is stored in payload memory 620 at a memory

address 622 *(i.e., address corresponds to a location with an ingress queue at which a payload corresponding to said data cell is stored)* **(Beshai, col. 10, lines 7-12)**.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the features of including an address corresponds to a location within an ingress queue of said switch structure at which a payload corresponding to said data cell is stored, as disclosed by **Beshai**, into the teachings of **Calamvokis-Hashemi**, to allow the system to identify/select and/or to access the payload of the data cell via the address corresponds to the location at which the payload of the data cell is stored.

26. Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Calamvokis, in view of Luijten et al. (US 6,324,164), hereinafter "Luijten".

27. As to claims 14-15, **Calamvokis-Hashemi** discloses the system of claim 13, but does not explicitly teach said multicast storage queue comprises 32 registers.

In an analogous art, **Luijten** discloses the bit map mode is based on the use of 32 Holding Registers of eight bits each for the multicast operation **(Luijten, col. 11, lines 45-65)**.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the features of including multicast storage queue comprises 32 registers, as disclosed by **Luijten**, into the teachings of **Calamvokis-Hashemi**, to load and hold the incoming data cell into the appropriate

queues that corresponds to the accurate output ports involved for the multicast operation **(Luijten, col. 11, lines 45-65)**.

Conclusion

28. Applicant's arguments as well as request for reconsideration filed on 04/24/2006 have been fully considered but they are moot in view of the new ground(s) of rejection.

29. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

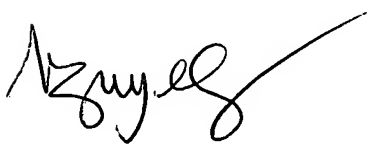
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

30. Further references of interest are cited on Form PTO-892, which is an attachment to this Office Action.

31. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quang N. Nguyen whose telephone number is (571) 272-3886.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's SPE, Rupal Dharia, can be reached at (571) 272-3880. The fax phone number for the organization is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Quang N. Nguyen
Primary Examiner – AU 2141
January 25th, 2008